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ABSTRACT

The 59 publications, identified through a search of Educational Resources Information Center (ERIC) publications and non-ERIC publications, were reviewed and analyzed to identify the major findings, promising developments, strategies, and methodological strengths and weaknesses which exist in curriculums designed for training dental assistants, dental laboratory technicians, hospital attendants, nurses aides, medical and dental technicians, and practical or professional nurses. Current training programs come closer to meeting immediate needs in some health occupational areas than in others. Of the occupational categories reviewed, only dental assistants and hospital attendants can receive training at the secondary level, while the remaining receive training at the post seccndary level. Though a number of curriculums are available, a major shortcoming is the general lack of a core or cluster curriculum. Curriculums for new and emerging occupations should be developed and evaluated through an educational planning system consisting of occupational analysis, program planning, program development and testing, and documentation and dissemination of the results. In addition, to provide and train necessary workers, improved counseling and recruitment programs and techniques will be required. (SB)

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review and analysis of curricula for

OCCUPATIONS IN HEALTH

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REVIEW AND ANALYSIS OF CURRICULA FOR OCCUPATIONS IN HEALTH

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PREFACE

This *Review and Analysis of Curricula for Occupations in Health* is one of a series of information analysis papers in vocational and technical education and related fields. It should aid curriculum development specialists, researchers, and practitioners in assessing the current "state of the art" in the field. The compact nature of the review should be of assistance to practitioners in identifying current curriculum offerings and useful materials to improve operating programs. It should also assist in identifying voids in our present research framework and enhance future studies, both in terms of their substantive focus and methodological approaches.

Where ERIC document numbers and ERIC Document Reproduction Service (EDRS) prices are cited, the documents are available in microfiche and hard copy forms.

The profession is indebted to Wiley B. Lewis for his scholarship in the preparation of this report. Recognition is also due Arthur Jensen, director, Vocational Education Media Center, Clemson University; and E. Joy Hill, Curriculum Lab, University of Kentucky, for their critical review of the manuscript prior to its final revision and publication. J. David McCracken, information specialist at The Center, coordinated the publication's development.

Members of the profession are invited to suggest specific topics or problems for future reviews.

Robert E. Taylor
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INTRODUCTION

An increasing concern toward the attainment of national goals will cause a rapid increase in the number of job openings in health occupations during the 1970's. The need for personnel in these occupations is being created by several socioeconomic, political, and technological factors. Among these factors, the most important are:

1. Population growth which results in additional people requiring health services;
2. Public expectations include more and better health care along with more equal distribution of health services;
3. Wider health insurance coverages have made more care available to a greater number of people;
4. Government involvement in planning and implementing federal health care programs and in providing financial support has made more health care available to the people;
5. Medical knowledge has been expanded to improve our ability to prevent, diagnose, and treat illnesses, making better health care possible;
6. Private and public costs resulting from unhealthy persons is being recognized as a hindrance to socioeconomic development; and
7. Our industrial economy has created a series of unforeseen health hazards.

These factors have contributed to the development of a need for additional medical facilities and personnel to meet the growing demands for health care. As noted by Teeple (1968), "Decreasing the gap between the potentialities of the modern health technologies and the availability of medical care to Americans is an important national objective." But the lack of an adequate supply of trained health manpower can frustrate the attainment of high-priority national objectives in many fields.

Health job openings of interest in this analysis will center around the six occupational categories listed below (Teeple, 1968).

1. Dental Assistants
2. Dental Lab Technicians
3. Hospital Attendents, including Nurses' Aides
4. Medical and Dental Technicians
5. Practical Nurses
6. Professional Nurses

Primary attention will be directed toward occupations in these categories which are directly involved in providing health services. Further information concerning these categories and their component occupations may be obtained by referring to the *Dictionary of Occupational Titles, 1965* and its supplements. How-

ever, care should be exercised in the use of these publications for it has been shown that discrepancies may exist between job descriptions listed in the *Dictionary of Occupational Titles* and descriptions provided by personnel associated with the various occupations (Horowitz and Goldstein, 1968).

A rapidly growing demand for health manpower coupled with the current situation of a slowly increasing supply of health workers has two principal implications for planning in vocational education. First, the rapid expansion in required health services means a parallel expansion in a broad spectrum of needs for trained health workers. Second, it implies an expanding base of job opportunities for individuals in the "left out" groups in American society.

Statement of the Problem

Projected demands for increased numbers of health workers have resulted in a need to synthesize information related to the training of skilled workers for the health occupations with special emphasis directed toward curricula for emerging occupations. As new technological and scientific findings are developed, or as shifts occur in job performance patterns, many existing occupational curricula will require revision or completely new approaches. Thus, providing instruction in emerging occupational areas will be a challenge to those persons responsible for the programs. This analysis of literature related to health occupations was undertaken in an effort to help these individuals:

1. Assess the availability and current development of curricula, materials, and guides for their development and use;
2. Identify promising developments and findings in the health occupations; and
3. Identify and describe the major conclusions and future research and development alternatives.

To help meet these needs, the remainder of this report will be directed toward accomplishing the following objectives:

1. To determine if additional educational programs are needed, and if so, identify which occupational areas require instructional emphasis;
2. To determine if curricula and curriculum materials are presently available for use in preparing students for occupational areas identified as important;
3. To identify the techniques and procedures used for developing available curricula and for providing instruction; and
4. To identify the techniques and procedures which should be used for developing curricula and for providing instruction in the future.

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REVIEW AND ANALYSIS OF CURRICULA FOR OCCUPATIONS IN HEALTH

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REVIEW AND ANALYSIS OF THE LITERATURE

Publications and documents listed in the bibliography were reviewed and analyzed in an effort to identify the major findings, promising developments, strategies, and methodological strengths and weaknesses which exist in curricula designed for training health workers. Such a review and analysis was believed to be important to those persons responsible for educational programs related to health occupations.

Need for Educational Programs

Estimates for the 1970's indicate annual openings for an anticipated 231,500 workers in health occupations (Teeple, 1968). However, the primary sources of such formal training, including the vocational education system, turned out only about 38,800 students who had completed vocational courses directed toward these occupations in 1967. Though the difference between the workers needed and those trained, 192,700, is inflated because of failure to include nurses trained through nonvocational level courses, this imbalance emphasizes the need for reassessing priorities in planning programs in health education.

By 1975 the national demand for health services and facilities will have generated employment for six million persons (Teeple, 1968). Over four million of these individuals will be employed in occupations with a specific health oriented content, while the remainder will be in occupations important to health and other areas. Of this work force performing direct health services, over two million will be nonprofessional workers who could profit from properly planned vocational programs.

This demand for nonprofessional workers in what was once a professional area has been caused by several developments. First, the health delivery system has changed. Once, it was the family doctor with one or more assistants; but it has now changed to physician clinics with a number of nurses and technicians, hospitals which have become health supermarkets, or neighborhood health centers with services directed toward low-income groups (Teeple, 1968).

Second, nonprofessionals have been substituted for professionals. Occupational substitution or the downward transfer of functions has occurred as the natural result of manpower shortages (Teeple, 1968 and Peterson, 1970). New medical equipment, devices, and tests also have contributed to this shift. Such substitution emphasizes the need for better training at lower occupational levels.

A third development which influenced this need for nonprofessional workers was the increase in facilities for the aged. Such facilities require a large number of these personnel.

New and emerging occupations have been and will continue to be caused by these changes. But where will they occur? While such occupations may develop in any one of the categories mentioned earlier, Teeple (1968) has indicated that the hospital attendants category includes most of the emerging subpro-

fessional human service health occupations such as nurses' aides and psychiatric aides. It should be noted that up to this time, these occupations developed because of a need, not because of a rational application of job analysis techniques. Literature reviewed for this analysis did not reveal any expected change in this procedure for the future.

Vertical worker mobility has been slow to develop in the health field. Writers such as Wallenstien (1968), Rosen (1968), Light (1969), and Teeple (1968) have indicated a need to further develop career ladders through special job training, remedial education programs, and changes in occupational and employment standards though a shortage of manpower has helped in this cause. Development of such mobility would be a major change in the health occupations, for they have been considered generally as a series of closed occupations permitting little advancement (Teeple, 1968).

Current training programs come closer to meeting immediate needs in some health occupational areas, practical nurses for example, than in others such as professional nurses and hospital attendants. However, the low ratio of training completions to anticipated job openings in each of the categories listed previously creates a presumption that sizeable returns would be likely to result from a greater concentration on programs in these fields in an effort to meet long term needs.

This presumption was reinforced by Lecht (1968) who indicated that the occupational categories under consideration, based on percentage of increase in employment, were high-growth occupational areas. Similar trends were indicated in a report of a study, *Occupational Employment Patterns for 1960 and 1975* (U.S. Department of Labor, 1968), which was sponsored by the Manpower Administration.

On the basis of available information, it is possible to rank the major occupational categories listed earlier according to the increased number of workers expected between 1962 and 1975 (Teeple, 1968). This ranking would be as follows, with the first category having the greatest numerical increase:

1. Hospital Attendants, including Nurses' Aides
2. Professional Nurses
3. Practical Nurses
4. Medical and Dental Technicians
5. Dental Assistants
6. Dental Lab Technicians

It must be remembered that these rankings, based on projected increases, were, and still are, subject to change because of changing conditions in the occupations. However, such rankings should prove of value to those individuals responsible for planning vocational education programs.

Since the occupations for which preparation will be needed have been identified in a general manner, consideration should be given to the individuals who received such preparation. As one might expect from a familiarity with the health field, vocational education in the related occupations is significant

primarily as adult education at the post-secondary level. The following listing taken from Teeple's (1968) paper shows the level at which the major portion of vocational education takes place for each of the occupational categories:

Occupational Category	*Major Level*
Dental Assistants	Secondary
Dental Lab Technicians	Post-secondary
Hospital Attendants	Secondary
Medical and Dental Technicians	Post-secondary
Practical Nurses	Post-secondary
Professional Nurses	Post-secondary

One readily notes that only two of the occupational categories receive major training emphasis at the secondary level.

In addition to actual employment training, vocational education programs also have provided pre-employment training for high school students. Such training was utilized to ensure a certain standard of competence on entry into a health occupation or a training program while young people can learn about an occupation before committing themselves to employment or further training. An example of such an educational program is *The Pre-technical Project, A Demonstration in Education for Technology* (1967).

While there is a need for expanding programs in health occupations to provide this type of training to students, the national policy of increasing and upgrading employment opportunities for the disadvantaged implies a continued emphasis on adult programs. Many job-oriented programs for the disadvantaged have been developed but additional and more refined programs will be needed for future training. For example, Rast's (1968) report of limited success with a pilot project for training mentally retarded individuals to serve as nurses' aides indicates a possibility of further expansion in this area.

In the health occupations, vocational education exists side-by-side with other training systems designed for preparing individuals for employment. These systems include programs conducted under the auspices of the Manpower Development and Training Act (MDTA), the Job Corps, the Armed Forces, post-high school institutions, proprietary schools, and through on-the-job training. But even with these systems, the number of trained workers is inadequate. Because of this, vocational education will remain viable in this area. High school vocational courses can provide pre-employment training and can encourage students to remain in school and acquire credentials suitable for entrance into health occupations or other specialized training programs. Vocational education along with MDTA and Job Corps programs also has provided basic education and occupational training courses needed to serve the needs of unemployed workers or workers whose job skills have been made obsolete by economic and technological changes. While increased educational opportunities are imperative, it must be realized that a period of time will be required before all workers entering health occupations will receive some type of formal training.

Curricula and Curriculum Materials

Orem (1966) has written that a curriculum is a pattern or blueprint for education. Larson and Blake (1969) emphasized the importance of a curriculum by calling it the "backbone" of the instructional process. It serves as a roadmap for vocational instructors to chart the course from meager student interest and knowledge of a vocation or cluster of vocations to achievement of the goal of employment. The success of the instructional program is wrapped-up, to a great extent, in the effectiveness of the curriculum.

Since the curriculum is important, a common understanding of its meaning should be established. The term has been defined many ways, but according to Leighbody it "is the sum total of the learning experiences for which the school has responsibility, whether they occur in school or not" *(Papers Presented at the National Conference on Curriculum Development in Vocational and Technical Education,* 1969). It should provide an outline of the practical training and related instruction required for the acquisition of a specific level of skill and knowledge in a particular occupation or cluster of occupations. With this as a basis, appropriate literature was reviewed to determine the availability of curricula for health occupations.

For the health occupations, a great number of curricula were found and reviewed. These curricula were designed to be used for preparing students for a single occupation or a cluster of occupations. For example, *Dental Assistant Training; Standard Course Outline* (1968) was designed solely for the preparation of dental assistants while the curriculum in the report titled *Pittsburg Technical Health Training Institute Demonstration Project* (Kishkunas, Volume II, 1967) was prepared to provide for basic student needs in the occupational areas of nurses' aides, practical nurses, and surgical technicians.

A review of the available literature revealed that curricula were available for the several occupations presently recognized in each of the occupational categories identified previously. The major shortcoming concerned with the availability of curricula, in the writer's opinion, is the general lack of core or cluster curricula.

Curricula included in the review generally were designed for one of two groups—adults (pre-employment or post-employment) and high school students. Though instruction for these groups is interrelated, the curricula should be prepared for the type of student being served. Dyer's *Orientation to Health Service Occupations and Nurse Aide Training* (1966) was prepared specifically for high school seniors while Gilbert and Fieldler's *Manual of an Instructional Program in Dental Assisting* (1964) and Milliken's publication, *The Ambulance Attendant* (1966) were designed for adults.

In addition to curricula, other curriculum materials were identified during the review and analysis. These materials were selected on the basis of Olivo's (Larson and Blake, 1969) definition of curriculum materials which states that "curriculum materials in vocational education refer to all the audio-visual sensory teaching-learning materials and devices used by the teacher and/or learner to teach or to master effectively and efficiently the skills, technologies, and general areas of learning required as a worker and as a citizen."

Textbooks, workbooks, study guides, standards, and instructional guides were found to be abundant in the literature related to health occupations. Several examples of programmed units were found during the review, including the unit by Goodson (1966). In addition to these materials, several publications such as that by MacConnell (1969) contained suggestions for planning program facilities. As was true with the curricula, these materials generally were available for each of the occupational areas.

The review and analysis of literature indicated that an abundance of guidelines, policies, and standards were available for use in developing educational programs for the various occupations. Most of these documents were published through the efforts of health worker organizations such as the American Occupational Therapy Association, American Physical Therapy Association, American Dental Association, or American Medical Association while one came from the American Association of Junior Colleges and one from the National Health Council. Thus, organizations such as those just listed or others such as the National League for Nursing, the American Nurses' Association and the National Federation for Licensed Practical Nurses can provide aid in the development of educational programs related to their areas of interest.

One should not consider that such materials—curricula, curriculum materials or standards—do not exist if they are not included in the bibliography. In addition to the fact that the bibliography contains only a few selected items, many materials of this type were prepared locally and/or on a limited budget and were not available for distribution. According to Leighbody, there is no way to know how much instructional material of this kind—syllabi or content documents—exists because it is not usually available for distribution. (*Papers Presented at the National Conference on Curriculum Development in Vocational and Technical Education,* 1969). This lack of distribution may have caused a duplication of effort in that other persons had to prepare similar materials for immediate use. The probability of such duplication was observed in several of the health occupational areas, especially in the areas related to practical nurses and nurses' aides. If extra effort was required, one should consider that it is generally recommended that those persons associated with the program should participate in developing the required curriculum. If teachers are to contribute as they should to curriculum improvement, they must participate, on a continuing basis, in curriculum development. But such development is not the teacher's task alone. A team composed of teachers of related subjects, researchers, and specialists from the field of work should be involved (*A Guide for the Development of Curriculum in Vocational and Technical Education,* 1969).

Only one reference reviewed contained information related specifically to curriculum materials other than printed matter—*Films for Use in Preparing for Nursing in Emergency Health Preparedness and National Defense* (1968). Because of limited references to materials such as films, television systems, projectors, and transparencies, it is very probable that "the media have been treated as addenda, as interesting appendages, instead of as the bricks from which actual curricula experiences are built" (Finn and Others, 1967).

Caution should be exercised in selecting and using materials related to these occupations. Each of the items reviewed was prepared for use with specific groups of people and this must be considered. Furthermore, consideration should be given to the fact that while many of the items reviewed were prepared only a few years ago, technological developments may have resulted in these publications containing inaccurate information.

One should note also the wide variety of sources responsible for the preparation of the curricula and curriculum materials. Though educational institutions were responsible for much of the material reviewed, health and medical organizations, publishing houses, and governmental agencies also made a great contribution. Because of the many sources from which such materials may be obtained, care should be exercised to secure instructional material from a reliable and competent source.

Curriculum Development

Present practices and procedures related to curricula development must be considered as a basis for developing curricula for the new and emerging health occupations. To discover the procedures and techniques used in developing curricula, it was considered necessary to review curricula, curriculum materials, and research reports. An attempt was made also to identify needed revisions in these procedures and techniques.

Analyses for Curriculum Development

Larson indicated that "curriculum development based on employment needs is the essence of effective payroll education for the youth and adult in today's world." Since this belief generally is accepted by vocational educators, job analysis has been used for many years as the basis for curriculum development in vocational education. Holloway and Kerr (1969) indicated that this technique had been used for curriculum development in the health occupations.

Because of continued and increasing employment needs, job analysis—the process of studying the operations, duties, and organizational relationships of jobs to obtain data for reporting the significant worker's activities and requirements—will continue to be an important part of such development. However, such analysis will be conducted under stricter guidelines and controls. One example of the use of this type of analysis may be found in the report titled *Pittsburg Technical Health Training Institute Demonstration Project, Quarterly Report, March 15, 1967* (1967). The activity described in the report concentrated primarily on job analysis of the surgical technician, practical nurse, and nurses' aide programs. In addition, Yagi and his associates (1968) recognized the value of such analysis in their publication dealing with the design and evaluation of vocational-technical education curricula.

A second type of analysis which has been used in developing curricula for health occupations is task analysis (Holloway and Kerr, 1969). This type of analysis is a method or a process by which a task, a subunit of a job, is examined and its characteristics, in terms of certain attributes, are identified. Fullerton and

others (1966) suggested that this procedure be used for curricula development in paramedical education and Mager and Beach (1967) suggested that this type of analysis be used as a basis from which to develop a course.

The third type of analysis which is used sometimes for developing curricula is occupational analysis. This type involves techniques similar to those of job or task analysis but the scope of the research is much greater. Occupational analysis has been described by Borow as the application of a systematic method of obtaining information focused on occupations and industries as well as on jobs, tasks, and positions (Larson, 1969).

Each of these three types of analysis has been used in developing curricula for health occupations. In reviewing and analyzing the techniques used in developing available curricula, this writer could not establish a clear difference between the three procedures. This is in agreement with Larson's (1969) statement that positive distinctions between and among the characteristics of the various systems of analysis are often difficult to establish.

To make this situation even more complicated, a fourth type of analysis, "eventual analysis," has been introduced by Decker (1967). He indicated that "'eventual analysis' consists essentially of making all key statements reducible to philosophical fundamentals, that is, to statements of childlike simplicity about real objects and real events."

Tuckman (1968) has introduced a fifth type of analysis—structural analysis. This type of analysis is a systematic approach to curriculum development representing an attempt to organize terminal performance objectives for a unit of subject matter into a sequence of prerequisite competencies which must be satisfactorily mastered if successful performance is to occur. It involves asking the question: "What competencies must a person already possess in order to obtain a satisfactory performance level on some specified objective, given no instruction beyond those definitions specific to the objective in question?" By asking this question of all identified competencies, a hierarchy of requisite competencies is generated which parallels the learning process appropriate to the final task.

Regardless of which type of analysis is selected for a particular situation, it is evident that analyses have been used as bases for analyzing the work performed by individuals in health occupations. But how is data for such analyses collected? Again, the curricula reviewed and analyzed showed that a variety of methods were used. These methods included mail surveys, interviews, observations, analyses of documents such as curricula and textbooks, and committees composed of persons associated with the profession. The major portion of the curricula reviewed were developed by securing analysis information from educators and/or administrators and having the results reviewed by a specialist in the occupational area. While this type of analysis has proved effective in the past, more sophisticated methods will be employed in the future.

Systems Approach

To expand the usefulness of the various types of analysis described above, curriculum building in health occupations is taking on a systems approach.

This approach involves analysis and further extends the development process by requiring performance objectives along with educational strategy to meet these objectives. The systems approach also requires that selection criteria for students be established. According to Miller (1969), this final step is important; for unless the student has the proper educational background and personality characteristics, the drop-out rate will be high.

While the systems approach has played an important role in only a few curriculum development projects such as the *Heatlh Services Mobility Study, Plan of Work* (1968), several studies have recognized the importance of behavioral objectives. Studies in this latter group included *The UCLA Allied Health Professions Projects* (1970) and *The Identification of Common Courses in Paramedical Education* (Fullerton and Others, 1966).

The consideration of selection criteria appears to be of extreme importance in health occupations. While material was reviewed concerning general occupational information such as *Pathways to Health Careers* (1966) and *Health Careers Guidebook* (Franklin, 1965), no specific selective criteria were located. Because of this apparent lack of materials, efforts should be made to develop and distribute items with specific criteria for student, counselor, and teacher use. Criteria should be prepared for high school, adult, and disadvantaged students in an effort to promote entry of individuals into health occupations. For example, Wallenstien (1968) indicated that about two-thirds of the health workers were women. Because the health occupations afford many opportunities for men, increased efforts should be made to encourage more males to enter these occupations.

Broad Training Base

Many of the curricula reviewed were prepared for narrow occupational categories though efforts have been made to employ the cluster concept in preparing curricula for vocational education programs in health occupations. Wallenstien (1968), and Killen and Shechtman (1969) have promoted the use of core curricula in training programs and Holloway and Kerr (1969) indicated it is one of the most popular topics in health occupations education. Under this concept, students enrolled in the program would receive a broad base of training which would help make them mobile and flexible in a job situation and provide increased employment opportunities and an opportunity to advance (Maley, 1966).

A possible result of the employment of the core concept is vertical mobility or initiation of the "ladder concept" (Holloway and Kerr, 1969). This is important so trainees will not necessarily end up in dead-end positions but will have the opportunity to advance. Turner recognized the close relationship between these two items—core curriculum and mobility— in *Proceedings of Symposium on Paramedical Education and Career Mobility* (1968).

Curriculum Materials

Curriculum materials have been treated as an important part of curriculum development in a few publications such as *Education for Health Tech-*

nicians—An Overview (Kinsinger, 1966) and *Training Plan Outlines for Man-Power Development and Training Act Courses for Nurses Aides and Nurse Aide Orderlies* (1966) but more emphasis must be placed in this area. This is very important, for while most educators know how to use media such as projectors, tape recorders, and television systems, few know when they should be used (Finn and Others, 1967). Instruction should be planned as a system to incorporate all of the media considered appropriate into a process which will result in the most efficient and effective learning. During this planning stage, publications similar to *Steps in Curriculum Construction* (1965) should be used as reference material.

Much consideration appears to have been given to programmed instructional materials for health occupations. Because of this, it is recommended that programmed instruction be integrated into formal training programs because it reportedly conserves instructor time, provides for flexible scheduling, and aids in standardizing content (McDaniel, 1968). Research involving the use of such materials has generally shown that this method is an effective part of the teaching-learning process.

Methodology of Curriculum Development

The need for educational programs, the availability of curricula and curriculum materials, and the techniques of curriculum development for health occupations have been examined in the previous sections of this review and analysis. With this as a basis, one can make a prediction as to how curricula will be developed to prepare workers for their initial work roles and to update their skills and knowledge once they have entered an occupation.

It is possible and very probable that research being conducted at the present time will help to answer questions related to this preparation as they occur. However, the literature reviewed during the preparation of this analysis contained little material related to current projects of notable interest concerning curriculum development in health occupations. This does not mean that many projects were not being conducted but that such projects were of local interest or simply not reported in the literature reviewed.

Analyses for Curriculum Development

Even without such research, it is possible to formulate procedures for the development of curricula which will keep pace with changes in health occupations. As a basis for such development, one must consider that "a realistic, functional curriculum depends upon an understanding of the needs and requirements of the occupational field. Determination of the elements of the occupation (the skills, knowledge, habits, and attitudes essential to employment) demand an occupational analysis" (Larson and Blake, 1969). Thus, some types of analyses will be used as the primary means of providing the data necessary for curriculum development. The use of these analyses is possible because as Roney has indicated, "occupational education is based upon the premise that the factors contributing to success in an occupation are relatively well-known and can be converted into certain educational experiences" (Larson and Blake, 1969).

Such analyses will be expanded to create a zoned analysis of the occupation. According to Larson, zoned analysis is a method of graphic delineation which may be explained as a system through which factors involved in any organization or research project may be arranged in orderly sequence on an easy-to-understand chart (Larson and Blake, 1969). Such an analysis proceeds from the general to the specific according to a predetermined and definite plan. This technique will aid the developer in preparing curricula for various employment levels within an occupation or in preparing a total curriculum which employs the "ladder concept." This latter curriculum would have multi-exit points and contribute to worker mobility within an occupational area.

How can one analyze a job which is just emerging or is changing? Such a situation requires the complete cooperation of personnel in education and employers and employees associated with health occupations, for the analysis should begin as the change is introduced. Priore (1968) indicated that when the normal training patterns are disrupted by new processes, industry continues to fall back on on-the-job training. The innovation is demonstrated to the operator who then perfects the requisite skills while performing the job. This same type of procedure is assumed to be true for innovations in health occupations.

For the educator to analyze the job during this introductory period, a communications network must be established and maintained with health employers and personnel. Because the introduction of change is a highly variable process, a system must be developed to monitor constantly the occupation involved in an effort to detect change. If curricula were prepared on a national basis or even a state basis and then revised for relevance to students in a given school, such a monitoring system would be feasible. In addition, curricula prepared on these levels would increase the need for standards of instruction and student performance which could lead to improved programs.

Systems Approach

Regardless of where the curriculum is developed, one of the analyses will not be the sole basis for its development. The analyses described earlier will be incorporated into a systems approach—"a 'closed-loop' analytic and developmental process which can be utilized to continuously: 1) assess the results of performance, 2) maintain sensitivity to performance requirements, and 3) provide for the self-correction of performance in order that the specified objectives can be achieved" (Miller, 1967).

Once the job is analyzed, performance objectives similar to those suggested by Mager (1962) and recommended by Tuckman (1969) will be formulated. Then the educational strategy to meet these objectives will be fixed along with selection criteria for the students (Miller, 1969). These selection criteria are important as the curriculum should be designed for the types of persons as well as for the job or job cluster. In fact, Kurth stated that occupational analysis has two broad elements—competencies the worker has or brings to the job and competencies the occupation requires (Larson and Blake, 1969).

One systems approach to preparing students for an occupation is shown in Figure 1. This system includes provisions for the presentation and evaluation of instruction in addition to steps necessary for actual curriculum development. These additional steps, as should be noted from the arrows, are of value because they provide a feedback of information which may be used for curriculum improvement. In this system, the developers considered the type of student entering the program as part of step 6, select instruction strategy. The use of such a system in planning and conducting an educational program should lead to efficiency in training and better prepared individuals while it provides a means of constantly updating the training program. If such an approach is used, it should be designed to meet the requirements of the immediate situation.

Educational Curricula and Curriculum Materials

Curricula must be developed to cope with the changes taking place in health occupations and the mobility of health workers. Kurth has indicated that spiral curricula which ensure continuity and sequential learning of subject matter related to the students' interests and needs are of value (Larson and Blake, 1969). Such curricula may use multi-exit points so the students can leave the program with various skill and knowledge levels and then reenter the program to secure additional job preparation. Under this system, initial preparation will be provided in a cluster of occupations while training will become more specific as job placement approaches.

Occupational packets which include a curriculum, transparencies, equipment lists and specifications, supply lists, budgets, a bibliography, and current reference material should be prepared. Such preparation and packaging is especially important for those occupations with fewer workers and in which few materials are available and few training programs are provided. In addition, an evaluation process should be devised to ensure the value of these materials and to determine the value of materials already available.

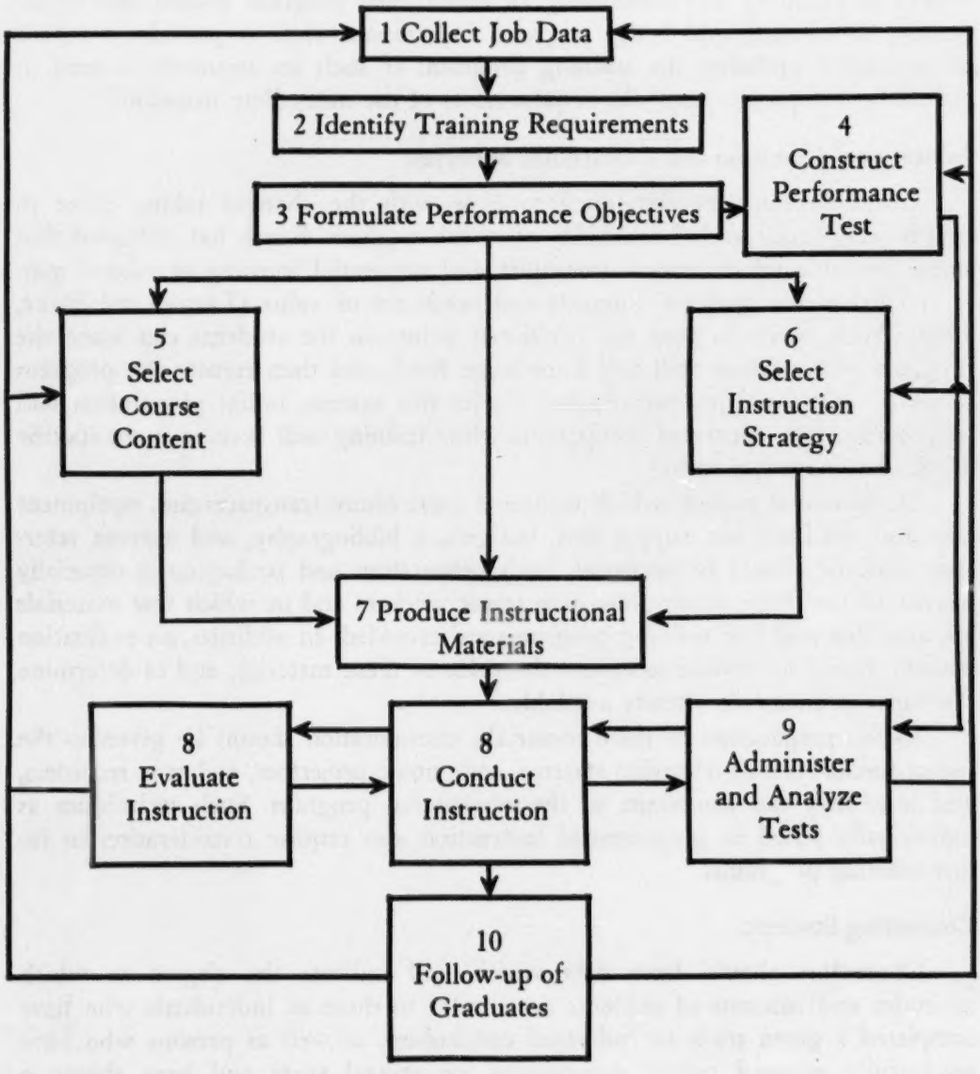
In the preparation of these materials, consideration should be given to the use of media such as television systems, computers, projectors, and tape recorders, and how they can contribute to the educational program. Such techniques as individually paced or programmed instruction also require consideration in future training programs.

Counseling Students

Counselors should have data which will indicate the degree to which aptitudes and interests of students are similar to those of individuals who have completed a given trade or industrial curriculum, as well as persons who have successfully pursued related occupations for several years and have shown a reasonably good level of job proficiency (Doerr and Ferguson, 1968). This statement is applicable to health occupations, for Stewart (1968) has shown that persons engaged in the health occupations and their training programs possess similar characteristics. Such data will increase in value as changes occur within the occupations and a means of providing this type of information and keeping it current should be established within the educational community.

Figure 1

A SYSTEMS APPROACH TO OCCUPATIONAL TRAINING*



* W. R. Tracey, E. B. Flynn, and C. L. J. Legere, "Systems Approach Gets Results," *Training in Business and Industry*, IV (June 1967), pp. 17-21, 32-38.

Performance proficiency measurements and standards should be considered as requirements in the educational program. Proficiency measurements will provide a means of measuring student progress or the lack thereof and serve as a basis for counseling. Kishkunas (Volume I, 1967) used such measurements for evaluating a demonstration program for selected health workers. Proficiency standards would help in determining the degree to which the student has achieved skills and knowledge necessary for entry into and performance in an occupation. Such measurements and standards are expected to play an important role in preparing training programs for minority groups.

Summary

Health care of the highest quality for all who need it is a goal that cannot be realized where there are serious shortages of health personnel. In trying to alleviate these shortages, it is unreasonable to expect a neat balance between training completions and job openings. While educators and health personnel should strive for such a balance, primary emphasis should be directed toward preparing the individual for work. To do this, a curriculum based on occupational analysis, student interests and needs, and the philosophy and objectives of the local school is required. This conforms with Orem's (1966) belief that "the basic design or pattern of a curriculum is established by the sphere of education to which the curriculum is directed."

Curricula for the new and emerging occupations should be developed and evaluated through an educational planning system. This planning should involve four major steps: occupational analysis, program planning, program development and testing, and documentation and dissemination of the results (Roney, 1967). This is very similar to the detailed procedure suggested in *The UCLA Allied Health Professions Projects* (1970) and both are similar to the system reportedly used in the past and being used today. At this time, it appears that personnel interested in health education have been able to perform these steps in a satisfactory manner. While curricula and curriculum materials are generally available for those occupations needed at the present time, improvements are needed and changes will be necessary. System changes necessary for the future involve placing additional emphasis on each of the four steps and employing stricter controls and guidelines. Special consideration should be given to occupational analysis and dissemination of the results.

New curricula alone are not enough. To provide and train the necessary workers, improved counseling and recruiting programs and techniques will be required along with improved uses of curriculum materials and teaching techniques. Efforts must be made to attract members of minority groups and men to meet future worker requirements. Additional research should be conducted to relate technological change and the responsiveness of health education curricula to this change.

No educational system can supply the relevant level of skills and competence required without receiving active feedback and support from persons associated

with the related occupation (Kraft, 1969). Because of this, a systems approach should be used not only in developing curricula but also for providing instruction. Future curriculum development and instruction will require that a complete and flexible communications network be established among all those affected by the educational program.

DESCRIPTION OF THE BIBLIOGRAPHY

Compilation

References believed to be of value to persons desiring information concerning curricula for new health occupations were identified through a search of both Educational Resources Information Center (ERIC) publications and non-ERIC publications. ERIC publications included:

Abstracts of Instructional Materials in Vocational and Technical Education (AIM), Fall 1967–Spring 1970.

Abstracts of Research and Related Materials in Vocational and Technical Education (ARM), Fall 1967–Summer 1970.

Current Index to Journals in Education, Volume I; Volume II, Numbers 1–3.

Manpower Research: Inventory for Fiscal Years 1966 and 1967.

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Research in Education (RIE), Volumes I-IV; Volume V, Numbers 1-7.

The three non-ERIC sources of information which were searched were:

CIRF Abstracts. Geneva, Switzerland: The International Vocational Training Information and Research Centre, C/O The International Labor Organization, Volumes I-VIII; Volume IX, First Dispatch (February 1970).

Corplan Associates of IIT Research Institute. *A Bibliography of Published and Unpublished Vocational and Technical Education Literature.* Illinois: Research Coordinating Unit, Vocational and Technical Education Division and State of Illinois, Board of Vocational Education and Rehabilitation, June 1966.

Ehrenreich, Julia W., ed. *Education Index.* New York: The H. W. Wilson Company, July 1964–May 1970.

While some of the later *Research in Education* indexes were searched manually by the writer, most were searched by computer. The remaining publications were searched manually by senior-level staff of The Center for Vocational and Technical Education, The Ohio State University, and/or by the writer. ERIC descriptors and strategies adapted from the *Thesaurus of ERIC Descriptors* and used in the searches are outlined below:

Curriculum	and	Health
or Educational Needs		
or Employment Qualifications		
or Instruction		
or Job Skills		

In addition to these searches of specific sources, a cursory search was made of related materials available in the library of The Center for Vocational and Technical Education.

Organization

The bibliography prepared as a result of these searches and a selection process was organized into two sections, literature identified from ERIC sources and that identified from non-ERIC sources. Publications identified through the cursory search of library materials were placed into one of these sections on the basis of whether they were listed in the ERIC publications reviewed earlier. If the materials identified were not listed in these publications, they were classified as from non-ERIC publications.

These sections were then divided into five subsections for ease of use. Items listed in each of these subsections were arranged alphabetically by author or title. The five subsections selected were:

Need for educational programs—Materials cited in this section contain information related to the need for trained manpower in the health occupations and the types of programs through which training is provided.

Curricula and curriculum materials—This section includes citations which concern education in the health occupations. These citations include material concerning program descriptions, student needs, course content, references, and instructional materials suitable for secondary and post-secondary programs.

Curriculum development—Documents listed in this section are those which deal with or are related to some aspect of curriculum development in the health occupations such as related research reports and projects and needed revisions.

Methodology of curriculum development—This section of the bibliography contains documents concerning the procedures or methods and projects which have applicability to curriculum development for new and emerging occupations.

Information sources—Publications cited in this section are those which were searched in an attempt to identify relevant material or which contain information of a general nature related to health occupations.

While the bibliographic entries were placed into these categories, such categorization is not meant to be exclusive. The various publications were listed in only one category, not in several categories. Because of this, references in categorical areas related to one's area of primary interest should be consulted for possible additional information.

Entries were selected on the basis of a limited review for their applicability to curricula for the health occupations. It is believed that the entries included in the bibliography are representative of materials available in relation to this topic and will provide a basic orientation to health occupations. However, the writer realized that this review did not include all material relevant to these occupations. For example, non-educational sources of information such as might be found in medical and military areas were not utilized.

Availability of Documents

Publications and documents identified as pertinent to this review and analysis and listed in the bibliography may be secured through many sources. However, for easier access to these items, certain sources should be considered.

ERIC publications from which literature was identified may be determined by the prefix to the identifying document number. Prefixes found in this bibliography are:

Prefix	*Publication*
ED	RIE
EJ	CIJE
MP	Manpower Inventory
VT	AIM, ARM

Most ED and MP documents are available on microfiche (MF) or hard copy (HC) from the ERIC Document Reproduction Service (EDRS). Orders must be forwarded to:

ERIC Document Reproduction Service
National Cash Register Company
4936 Fairmont Avenue
Bethesda, Maryland 20014

EDRS prices cited in this bibliography reflect pricing in effect at the time of publication. Recent price schedules and ordering information available in the current issue of *Research in Education, AIM,* or *ARM* should be consulted prior to placing an order.

CIJE entries usually can be found in periodicals which are available in local libraries. Items with a VT prefix generally can be found on microfiche in a VT-ERIC set which is available in many libraries or which may be ordered from EDRS. ED, MP, and VT items not available on microfiche or hard copy from EDRS may be secured from another source which is listed in the bibliography.

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